SWIM Users Forum

Presented by: FAA SWIM Program Office November 2, 2021

System Wide Information Management AJM-316



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moderator will be alerted and will read your question aloud on your behalf or respond to you via text.



Agenda

- SFDPS OARS Table Changes
- NCR Update
- NESG Update
- How Users Can Access NOTAMs
- SWIFT 16 Preview



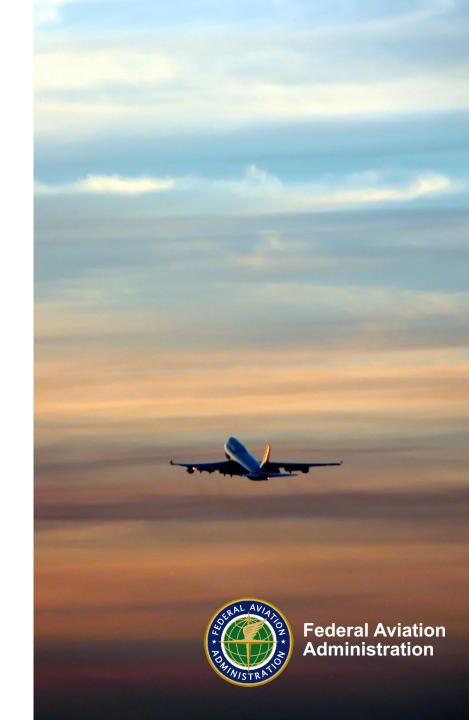
SFDPS OARS Table Changes: Release 1.5.0

Presented by:

Ross Skiles

Systems Engineering Support

System Wide Information Management AJM-316



Agenda

- Release 1.5.0 Overview
- SFDPS Data Field Summary
 - Flight Plan Message Changes
 - Track Message Changes
 - Special Activity Airspace Message Changes
 - Miscellaneous Message Changes
 - Data Base Reconstitution Message Changes
- Release Benefits Summary

SFDPS Release 1.5.0 Overview

NAS Service Registry and Repository https://nsrr.faa.gov

- Locate SFDPS services identified as Lifecycle Stage: Verification
- Locate files under tab: Service Documents
- File Names:
 - NAS_JMSDD_4309_001_RevD-UNSIGNED-20211016.docx JMS data description
 - OARS-Examples.zip Sample SFDPS data with new OARS fields
 - SFDPSSchema v1.3.9.xsd schema with OARS update

Update the SFDPS software:

 The SFDPS Operational Analysis and Reporting System (OARS) table allowing current available data fields to be delivered to SFDPS from ERAM Data Distribution System (EDDS); include additional available data in messages; format the output in simple XML and AIXM/FIXM formats and publish data to NAS Enterprise Messaging System (NEMS); Correct software defects tracked with Jira Tracking Tool

Update the SFDPS Schema:

 Include all data fields received from the from the EDDS; particularly the altitude fields in both the SU simple extensible markup language (XML) reflecting updated ERAM functionality and the SU_AIXM (Aeronautical Information Exchange Model (AIXM)) messages



New SFDPS Data Fields Summary

- FH (Flight Plan), AH (Flight Plan Amendment) and HU (Flight Plan Update) messages
 - From Traffic Management sources
 - Traffic Management Reroutes
 - Time-Based Flow Management (TBFM) Constraint Satisfaction Point (CSP) ID and speed advisories
 - Adding Flight Plan (Flight Strip) Revision Number
 - Fixing Flight Plan Sequence Number
- TH (track) messages
 - From ERAM ADS-B source
 - Added 6 additional data fields derived from ERAM ADS-B source data
- Adding 00E (time in hhmmss + 4-digit sequence number) field for all FIXM message types
- Addressing ERAM Special Activity Airspace Status (SAA) Message Functional Change
 - Update SFDPS SAA message to current EDDS message format to include all controller entries

FH, AH and HU Messages Traffic Management Reroutes

- Traffic Management (TFM) Protected Area Protected from what?
 - The Reroute produced by traffic management is protected from being overridden by automated preferential route processing
 - Contains a route amendment of up to 1,000 characters
 - The amended route will also become the route field when accepted by the controller and issued in a clearance
 - This field will be present in the simple XML version
 - This field will not be present in this release in the FIXM version because of size constraints
 - A change request will be submitted for inclusion in US FIXM extensions and included in a later SFDPS release
- Traffic Management Initiative (TMI) Identifier example when accepted by the controller
 - name="TMI_IDS", value="RRDCC00348-RRDCC00444"
- Suppressed TMI Identifier example when rejected by the controller
 - name="TMI_IDS", value="RRDCC00348-RRDCC00444"

OARS Table New Fields	SimpleXML tags	FIXM - nameValue fields	
180A0 - TFM-Protected-Area	TFMProtectedArea_180a		
181A0 - TMI-Identifier	MI-Identifier TMIIdentifier_181a		
182A0 - Suppressed-TMI-Identifier	suppressedTMIIdentifier_182a	- "TMI_IDS"	



FH, AH and HU Messages

Time-Based Flow Management

- Constraint Satisfaction Point (CSP)
 - Meter Reference Point (MRP) name. A MRP can be either a CSP name or non-CSP metering arc name.
 - MRP has two subsets:
 - CSP location used to de-conflict traffic and used as a delay distribution point.
 - ERFMP represented by a TBFM metering arc.
 - AFMP represented by a TBFM metering fix or a TBFM metering arc.
 - Non-CSP metering arc any outer arc applicable to a CSP which is used only as a delay distribution point.
 - Examples: Field 68 G = LCH/J, Field 68 G = DAS

Cruise Speed Advisory Phase and Descent Speed Advisory Phase

 All cruise & descent speed advisory fields are combined. If the cruise and/or descent flight phase indicator is present, it will be accompanied by only one value (either Calibrated Air Speed (CAS) or Mach type). At most, there will only be four values present. Delineated by "-". Example: "C-M80—" or "C-M74-D-280"

OARS Table New Fields	SimpleXML tags	FIXM - nameValue fields
68G0 - CSP-Name	CSPName_68g	"CSP_NAME"
343A1 – CruiseSpeedAdvisoryFlightPhaseIndicator	cruiseSpeedAdvisoryFlightPhaseIndicator_343a1	
344A1 – CruiseSpeedAdvisoryValueMach	cruiseSpeedAdvisoryValueMach_344a1	
344B1 – CruiseSpeedAdvisoryValueCAS	cruiseSpeedAdvisoryValueCAS_344b1	"CDEED ADVICORY INFO"
343A2 – DescentSpeedAdvisoryFlightPhaseIndicator	descent Speed Advisory Flight Phase Indicator_343a2	- "SPEED_ADVISORY_INFO"
344A2 – Descent Speed Advisory Value Mach	descent Speed Advisory Value Mach_344a2	
344B2 - DescentSpeedAdvisoryValueCAS	descentSpeedAdvisoryValueCAS_344b2	

TH Messages Aircraft Track Information

- Adding additional track information to existing ERAM Air Route Surveillance Radar (ARSR) 12 second track messages
 - For each ERAM ARSR track message that has corresponding track data received from ADSB with respect to time, the following derived ADSB data will be added:
 - Position in latitude/longitude coordinates
 - Altitude
 - Velocity
 - Track time (ADS-B)
 - Aircraft Registration Number (Tail Number)
 - 24-bit ICAO Address/Mode S 6 HEX character address
 - Aircraft Registration Number and 24-bit ICAO Address are combined in a single field

OARS Table New Fields	SimpleXML tags	FIXM - nameValue fields
174A0 - ADSB-TargetPosition	ADSBTargetPosition_174a	name="ADSB_POS_174A"
175A0 - ADSB-TargetAltitude	ADSBTargetAltitude_175a	name="ADSB_ALT_175A"
176A0 - ADSB-TargetVelocity	ADSBTargetVelocity_176a	name="ADSB_VEL_176A"
177A0 - ADSB-TargetTime	ADSBTargetTime_177a	name="ADSB_TIME_177A"
2M0 - ADSB-Target ID	ADSBTargetId_02m	name="ADSB_02M_52B"
52B0 - ADSB-24bit-ICAO-Address	ADSB24BitIcaoAddress_52b	Hallie- ADSD_UZIVI_SZB

SU Messages Special Activity Airspace (SAA)

- Manually activating multiple airspace blocks and setting the SA status to active
 - Adding this change to SFDPS resolves a consumer issue
 - Previous SFDPS SU message did not reflect an ERAM functional change that allowed controllers to enter multiple altitude blocks to an active status
 - This resulted in consumers not receiving the full ERAM EDDS SU message
 - The SFDPS messages will allow up to 10 manually entered altitude blocks when setting an SAA status to ON
 - This will align the SFDPS SU messages with current ERAM functionality

OARS Table New Fields	SimpleXML tags	AIXM
178A0 - SAA-	SAAManualLowAltitude_178a	geometryComponent/AirspaceGeometryComponent/t
ManualLowAltitude		heAirspaceVolume/AirspaceVolume(id="SU_schedule_
		airspaceVolume_x_ManualLimits")/lowerLimit
178B0 - SAA-	SAAManualHighAltitude_178b	geometryComponent/AirspaceGeometryComponent/t
ManualHighAltitude		heAirspaceVolume/AirspaceVolume(id="SU_schedule_
		airspaceVolume_x_ManualLimits")/upperLimit
179A0 – SAA-	SAAManualActiveType_179a	extension/SAAManualAltitudeActiveTypeExtension/saa
ManualActiveType		ManualActiveType

HS and HR Message and data field 0E0 present in all Messages

Release Information (HS) message

- Provides ARTCC operational adaptation identification
- Needed by consumers using ARTCC adaptation to insure operational consistency

OARS Table New Fields HS Messages: only published in Simple XML	SimpleXML tags
169B0 - CMS-ReleaseInformation	CMSReleaseInformation_169b

Route Status (HR) Message

 Provides a change to the size of each route element needed to accommodate larger Route Status Flements

OARS Table New Fields	Simple XML tags	
RouteStatusElements	routeStatusElements_135a	

Time + Sequence Number (00E) Message field

- This data field is present in every message and contains a time in hours, minutes and seconds concatenated with a digit message sequence number.
- This has been added to FIXM to aid with identifying missing messages.

OARS Table Field	SimpleXML tags	FIXM - nameValue fields
00E - SourceTimeAndSeq	sourceld_00e	name="SOURCE_TIME_AND_SEQ"



SFDPS Data Base Reconstitution from EDDS/HADDS

- SFDPS DBRTFPI utilizes an EDDS/HADDS reconstitution capability that provides <u>all tracks and all flight plans</u> from an ARTCC at startup or upon request
 - Messages have all the same fields as FH/AH/HU and are output in Simple XML and FIXM.
- SFDPS DBRTRI utilizes an EDDS/HADDS reconstitution capability that provides <u>all adapted preferential departure and</u> <u>arrival routes</u> from an ARTCC at startup or upon request
 - Messages have all the same fields as the HR messages changing the RouteStatusElements field size to accommodate elements with an additional character and are output in Simple XML and AIXM.

Release Benefits Summary

- Flight Plan Messages, (FH, AH and HU)
 - Traffic Management enhancements
 - TM Reroutes provides both internal and external consumers with the source of the route and route priority preventing automated revisions
 - TBFM speed advisories provide both internal and external consumers with assigned cruise and or descent phase speed advisories to help with calculating more accurate arrival times
 - Flight Strip Revision Number
 - Provides an important data field to aid controllers using flight strips and pilots using SFDPS flight plan data to verify that flight data is consistent and current. ERAM has recently key-sited this change at ZBW ARTCC.

Release Benefits Summary Continued

- Track Messages (TH) adding ADS-B data fields to ARSR 12 second radar track updates
 - Six fields added including report time, latitude/longitude, altitude, velocity, altitude, aircraft registration number and ICAO HEX address
 - Supplements aircraft location with GPS derived aircraft location and altitude
 - Help identify ARSR radar errors
 - Aircraft ICAO HEX address (Mode S transponder code) and aircraft registration number
 - Provides Abacus program with aircraft ICAO HEX address
 - Provides unique aircraft identification to prevent mismatch with flight plans and clearances
 - Potential to help identify filed flight plan errors
 - Potential to improve sensitive flight data processing
 - Improve alignment and fusion of SWIM track and flight plan data from all data sources

Release Benefits Summary Continued

Special Activity Airspace (SAA) SU message

- The ERAM program enhanced controller entry for entering multiple altitude blocks when setting SAA airspace to active status
- SFDPS is currently truncating the SAA message and only publishing the first altitude block when the message entered by controllers may have included up to 10 altitude blocks
- With this change, SFDPS will be aligning the SU message output to accurately reflect what controllers have entered

Release Benefits Summary Continued

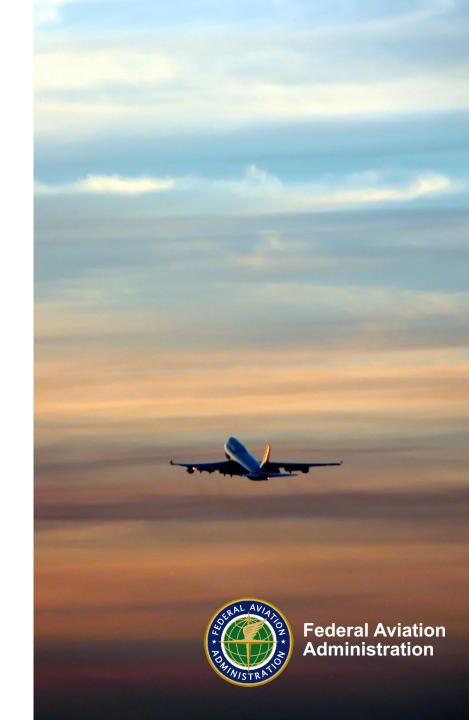
- Adding 00E Time and message sequence number to all FIXM messages
 - Adding this data field will be utilized to troubleshoot reports of missing SFDPS data by using a concatenated EDDS/HADDS data field that provides a sequence number for every message sent to SFDPS by ARTCC and message type
 - SFPDS second level support will develop monitoring and analysis with software tools to quickly identify data missing from the source
 - It will also be used to compare input with output to verify that all data is received
 - This functionality will become critical as SFDPS attains efficiency critical operation serving NAS systems with efficiency critical source requirements

NAS Common Reference (NCR)

Presented by:
Michael Pozsgay
NCR Lead

Ramesh Ravella, PhD NCR Support

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Agenda

- NCR Overview
- Current Status
- External Users On-ramping
- Next Steps

Purpose of NAS Common Reference (NCR)

Consolidate NAS Data

 Acquire and integrate NAS status and constraint information from cross-domain sources

Provide Filtered Constraints

 Provide the ability for constraints to be retrieved for a specific 4D trajectory (4DT) and/or a defined airspace volume

Provide Auto - Updates

 Provide an interface to obtain defined sets of information via one-time request or via request with future updates

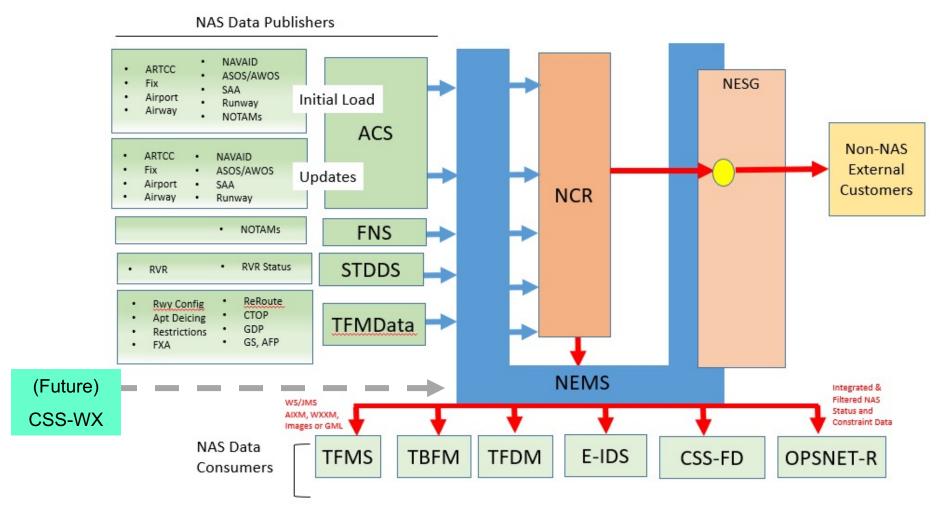
Correlate NAS Data

 Create a spatially and temporally correlated view of NAS data to improve common situational awareness

NCR Overview

- NCR is a NAS Program that provides SWIM Services for parsing, storing, and correlating NAS data
 - Consumes data from multiple SWIM producers across NAS domains
 - Aeronautical
 - Traffic flow management
 - · Weather future
 - Data standardization
 - Geo-referencing
 - Units of measure
 - Coordinate reference systems (CRS)
 - Dynamic user queries
 - Any combination of geospatial, temporal, and attribute filters
 - Think of a database query
 - Queries can be submitted as subscriptions
 - Applies constraints to trajectories (in 2D, 3D or 4D)

NCR System Architecture



NCR 1.1 Available Constraints

TFMData Flow Information Service Federal NOTAM System – NOTAM Distribution Service (FNS-NDS)

National Airspace System – Resources (ACS)

ACS + FNS-NDS

STDDS ISMC

Standard Terminal Data Distribution Service (STDDS) APDS

Airspace Flow Program (AFP)

Airport Configuration (APTC)

Collaborative Trajectory Options Program (CTOP)

Deicing (DICE)

Departure Spacing Program (DSP)

Flow Evaluation Area / Flow Constrained Area (FXA)

Ground Delay Program (GDP)

Ground Stop (GS)

Minutes-in-Trail (MINIT)

Miles-in-Trail (MIT)

Reroute

Stop

Advisory Text



(APDS) Status

Airport Data Services

Runway Visual Range (RVR)

Notice to Airmen (NOTAM)

Special Activity Airspace (SAA)

Active SAA

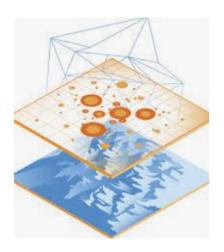
Consistent Data

Temporal



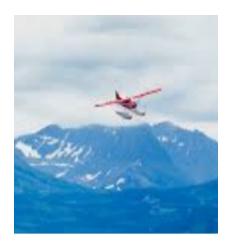
- Issue time
- Start time
- End time
- Expiration time

Spatial



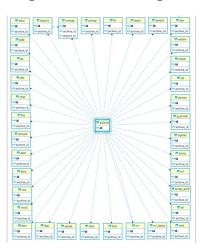
- Geo reference
- Min altitude
- Max altitude

Unit of Measure



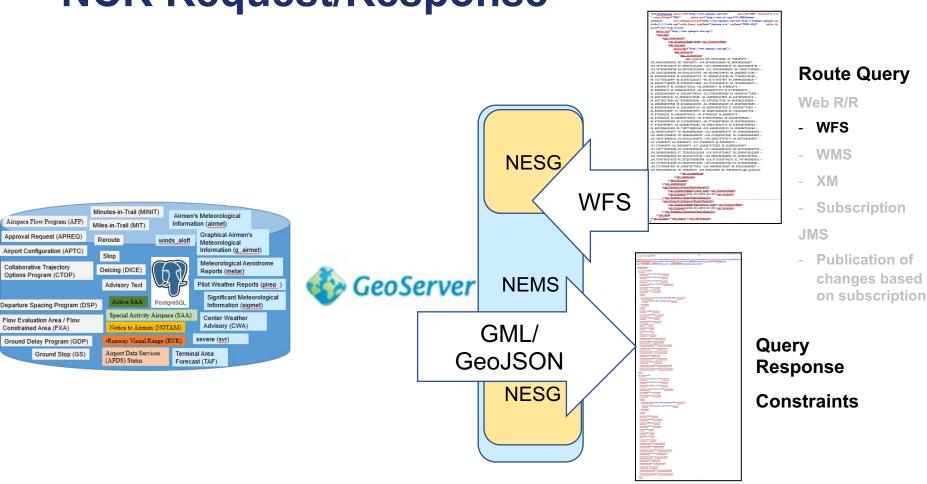
- Altitude -Mean sea level
- Units Feet
- CRS 4326

Reference to original message



- Original messages in archive table
- Feature table rows link to an original message

NCR Request/Response



Current Status and On-ramping Process

- NCR Initial Operating Capability (IOC) version deployed in operational environment in September 2021
- Currently available to internal consumers for monitoring stability and performance
 - Will be doing some performance tuning in the next few months
- External users will be on-ramped in the first half of CY2022 in batches
- Before on-ramping, NCR will help external users in building their client software and testing in FAA test environment

External Users Kickoff

- Had kickoff with our first batch of external users on 10/28/2021
- First batch
 - Boeing, NASA, Delta Airlines, JetBlue, Mosaic
- Users will develop their clients from the sample client NCR team is providing
- Users will test their connectivity to NCR in a test environment
- Users will then be connected to NCR in operational environment
- This on-ramping process will take 3 to 4 months

Second Batch of External Users

- Plan to start a second batch of users in February March 2022 timeframe
- NCR documentation is available in NSRR
- Currently taking requests for the second batch
- If you are interested, please send an email to: <u>SWIM@faa.gov</u>

NCR Points of Contact

- Michael Pozsgay, NCR Capability Lead
 - Michael.Pozsgay@faa.gov
 - Ph 202-267-8392
- Ramesh Ravella, PhD, NCR Support Lead
 - Ramesh.Ravella@noblis.org
 - Ph 202-715-2907
- David Johnston, NCR Support
 - David.Johnston@jma-solutions.com
 - Ph 202-683-1441
- Keith Short, NCR NSRR POC
 - Keith.Short@cavansolutions.com
 - Ph 303-999-1671

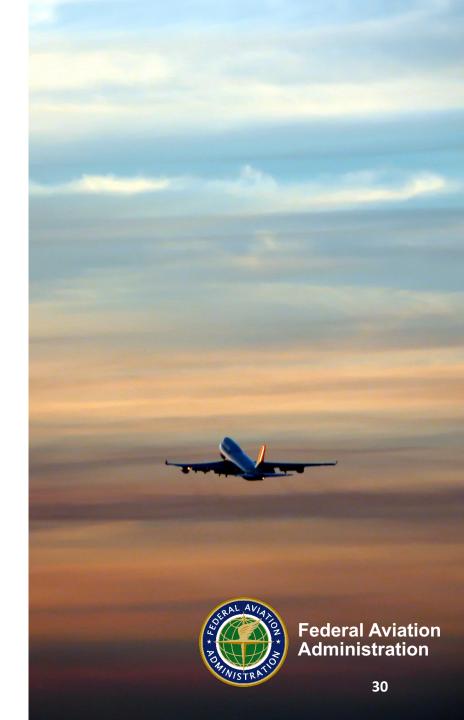
NESG Update

Presented by:

Mark Parra

SWIM Communications and Outreach

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For Users Connecting via NESG!

- Internet Key Exchange version 1 (IKEv1) Upgrade
 - The FAA has directed L3harris' FTI security team to upgrade all IKEv1 VPN tunnels to IKEv2. This is part of FTI's continuing efforts to strengthen our security posture.
- VPN tunnels into the NESG at all locations will be upgraded (OEX, ACY, SLC, and ATL).
- FTI Security will work with you to upgrade ALL of your VPN tunnels.
 - To set up an appointment date please reach out to FTI Security: FTI_SEC_OPS_ENG@L3Harris.com

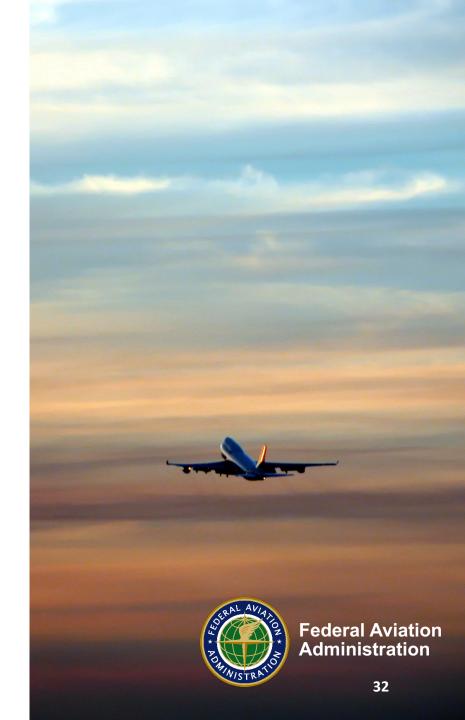
How Users Can Access NOTAMs

Presented by:

Todd Emo

Systems Engineering Support

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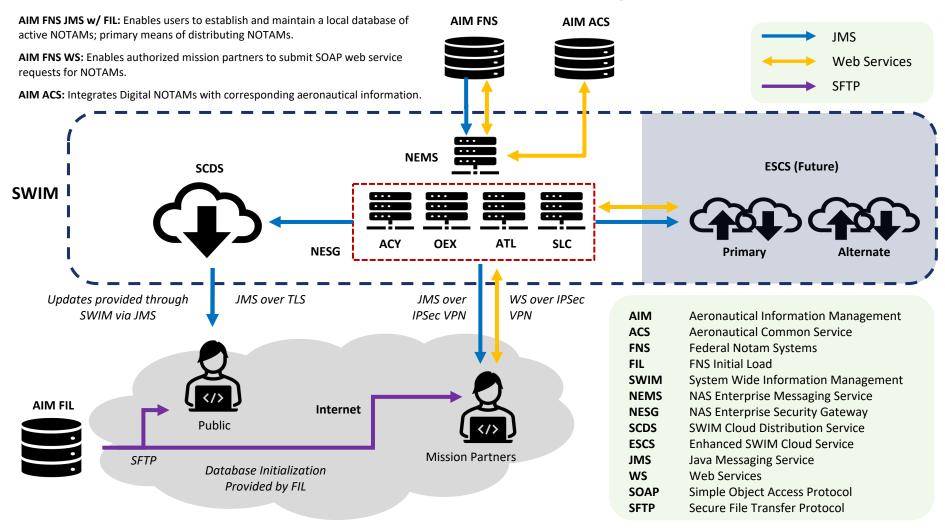


Connecting to NOTAM Data

- FAA is streamlining consumer access to NOTAM data
 - Focusing on access points that meet distinct user needs
- Brief is focused on system access to NOTAM data services
 - Machine-to-machine interfaces

FNS NOTAM Publication Service (NPS)	NOTAM Application Programming Interface (API)	Aeronautical Common Service (ACS)
Pub/Sub NOTAMs via JMS over SWIM	NOTAMs via WS using OpenAPI Standard	Integrated Aeronautical Information web services via SWIM

NOTAM Distribution Through SWIM



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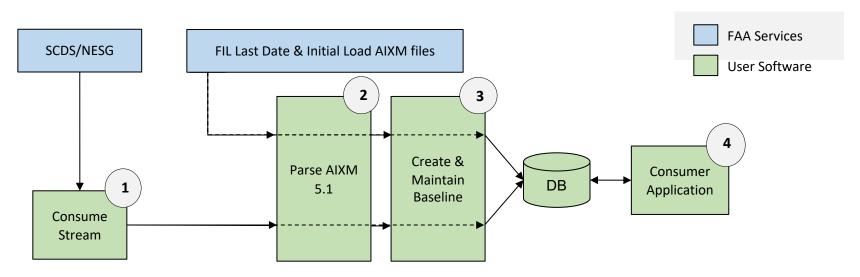
SCDS for New Users



How Can I Access FIL?

- If you did not receive your FIL Credentials, send an e-mail to 9-AJO-AIDAP-Transition-Help@faa.gov
 - For existing AIDAP users, provide your existing AIDAP username
 - For existing SWIM NPS users, provide the e-mail used to sign the FAA access agreement
 - You should expect to receive FIL credentials within a few days
- Future SWIM NPS users will receive a FIL email as part of their on-ramping process

Use Case for Automation



Steps:

- 1. User sets up a SWIM application consuming NOTAM change messages
- Consumer application checks FIL date file for currency and retrieves current set of active NOTAMs
- Consumer application initializes local database using FIL file to make a baseline of active NOTAMs and maintains baseline with changes coming from NOTAM Stream
- 4. Consumer application queries local database



FIL Files and Formats

- SFTP access provides access to two files:
 - initial_load_aixm.xml.gz
 - A compressed xml file containing a feature collection of AIXM 5.1 NOTAMs
 - primary last date.txt
 - A tiny text file containing a date
 - Example: "2020-10-12 23:06:01"
 - Indicates the time at which the initial load file was complete and valid

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FnsClient - Reference Code

Overview

 SWIM is providing an FNS Java Messaging Service (JMS) Reference Implementation called *FnsClient*

Function

- FnsClient establishes and maintains a local instance of the FNS NOTAM Database using FNS FIL and SWIM FNS JMS services
- FIL provides all active NOTAMS to initialize a NOTAM database
- A SWIM JMS service provides NOTAM updates to keep the NOTAM database current

Features

- FnsClient also re-initializes the local NOTAM database if a JMS service interruption is detected via CorrelationID monitoring
- Includes a REST API interface to query into FnsClient local database

FnsClient Prerequisites

- Install JDK 11 or higher
- Install Maven
 - Used to compile and deploy reference code
 - https://maven.apache.org/install.html
- Locate your SCDS credentials
 - Navigate to: https://scds.swim.faa.gov/
 - Sign In
 - Click the icon for connection information
- Prepare your FIL credentials
 - Locate and follow instructions on your "FIL Credentials" email
 - Convert OpenSSH format to RSA (aka pem) format using:
 - ssh-keygen -p -N "" -m pem -f /path/to/key

FnsClient Access

- Reference code is <u>provided as a reference only</u> and has not been tested to meet your requirements
- Reference code and documentation is open source and is available at the following link
 - https://github.com/faa-swim/fns-client

CorrelationID Use (1/2)

- Why do I need to use the CorrelationID?
 - The CorrelationID will help you determine if your system is missing a message from NPS
 - With this knowledge you may decide to reinitialize or validate your NOTAM database using FIL
 - Proper use of the CorrelationID can provide confidence that your local data store matches FNS
- What is the Correlation ID
 - A positive number provided as an FNS-NDS Pub/Sub-specific property that is unique per NOTAM message distributed via FNS Publication Service (NPS)
 - The CorrelationID is incremented for each successive message published from NPS
 - Both NESG-based and SCDS services contain the CorrelationID

CorrelationID Use (2/2)

- How do I use the Correlation ID?
 - By extracting the CorrelationID you will be able to identify missed messages from NPS
 - NOTAM messages, and hence CorrelationIDs, may be slightly out of order due to the network
 - It is recommended that you add logic to determine if you have a missing NOTAM
 - A recommended timeframe to allow a Correlation ID to come out of order is 5 minute
 - For example: If you receive 1001, 1002, 1004, it is recommended that you wait at least 5 minutes after 1004 before concluding that you have a missed NOTAM
- How do I find the Correlation ID?
 - The Property Name is: us_gov_dot_faa_aim_fns_nds_CorrelationID
 - A possible implementation in Java is: message.getStringProperty ("us_gov_dot_faa_aim_fns_nds_CorrelationID")
 - Do not attempt to use getCorrelationId() as it will not return the CorrelationID for the message
- What if I detect a missing NOTAM?
 - Call FNS Initial Load (FIL) to reinitialize your NOTAM data store



Documentation

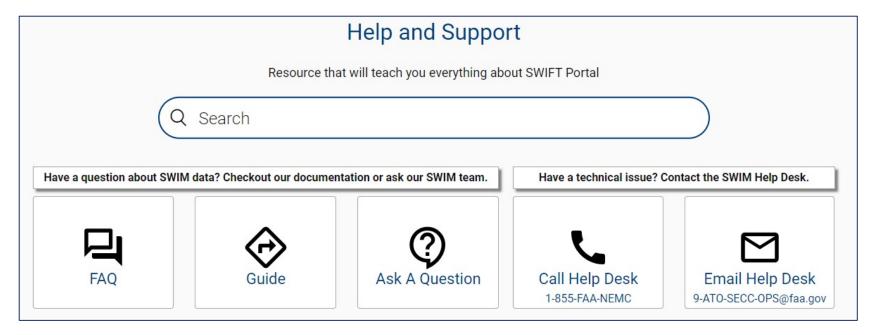
- All documents are available from the NSRR at the following link: https://nsrr.faa.gov/services/fns-notam-pub-v2/documents
- Search for the following in the service documents section of the SWIM service "FNS NOTAM Publication v2.0":
 - FIL-FNS NOTAM Distribution FAQ 2020-10-13.docx (Oct 2020)
 - NAS-JMSDD-2310-001_Final-4.docx (July 2020)
 - NAS-WSRD-2310-001_Final-4.docx (July 2020)
 - AIDAP User Transition Packet 1 (Feb 2020) includes:
 - Mapping AIXM 5.1 to AIDAP XML
 - Instructions to configure SCDS Jump Start Kit (JSK)
 - Sample FNS Initial Load (FIL) file
 - Sample SCDS NOTAM message files

Questions?

- For SWIM questions:
 - data-to-industry@faa.gov
- For more information on SCDS:
 - https://scds.swim.faa.gov/
- For questions on getting connected and anything about the data itself:
 - SCDS@faa.gov
- For operational issues where a user has been connected but is experiencing a loss of service:
 - 9-ATO-SECC-OPS@faa.gov
 - 855-322-6362, option #3, then option #1

SWIFT Portal

Check out the SWIFT Portal Support Page to learn more, ask a question, or reach out for help with a technical issue







portal.swim.faa.gov

Explore SWIM data, subscribe to services, and collaborate with other users

SWIM Industry FAA Team (SWIFT)

November Status Update

Presented by:

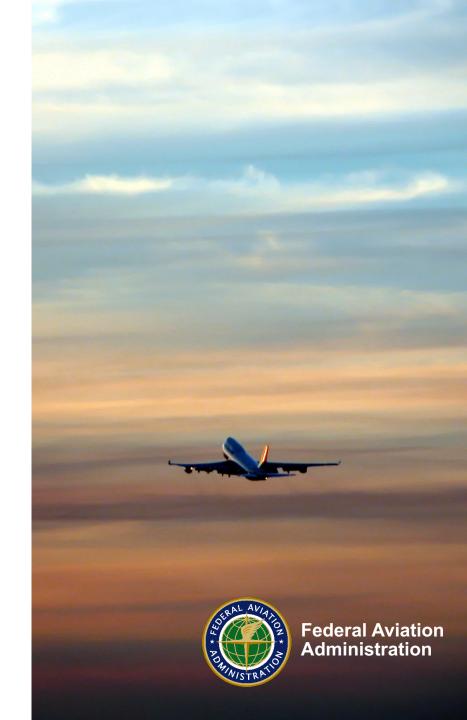
Ray Mitchell

Systems Engineer LST Contract Support

Xavier Pratt

Systems Engineer LST Contract Support

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SWIFT 16 Preview

Theme focused on Trajectory Management

- When:
 - November 10, 2021, from 12:30pm 4pm ET Virtual Event...See you there...
- Expect updates from SWIM Producer Programs and Special Topics:
 - TFDM Updates Trajectory Based Data Discussion
 - Cloud and You What does this mean to me as a SWIM User
 - ESCS and Portal Recap, what's new, and how its going
 - SWIFT Focus Groups Updates:
 - New York Area Case Study Ops Issues Focus Group
 - Latest Context Documents and planned releases
 - Development & Analytics Focus Group Update (TBFM Delay Resolution)

SWIFT 16 Brings new user experience – MS Teams Webinar! Registration is now available.



Upcoming SWIM Events

- SWIFT 16
 - Wednesday, Nov. 10, 2021 from 12:30-4pm ET
- ATCA Annual Conference
 - February 7-9, 2022

We hope to see you there!

